Amendments to the Specification

Please replace paragraph **[0001]** with a clean version of the following paragraph:

[0001] This application is a continuation of United States patent application Serial Number 10/173,335 filed June 14, 2002, issued as United States patent number 6,638,341 on October 28, 2003, which is incorporated herein by reference in its entirety.

Please replace paragraph **[0007]** with a clean version of the following paragraph:

[0007] There is an equivalent ~~processes~~ process used when the active sites on a substrate are of only limited decontamination activity initially. Such sites must be "activated" by contacting them with an activating gas, causing them to become much more active for decontamination. The mechanism of activation is not important for this invention. What is important, however, is that the activating gas must come into contact with the surface sites of the substrate in order to activate them. Thus the purging gas must be forced to as many of the activation sites as possible during activation. A particular substrate may require both activation and preconditioning, which may occur simultaneously or in sequence, and may be accomplished either by different gases or by the same gas.

Please replace paragraph **[0008]** with a clean version of the following paragraph:

[0008] It will be evident that for both preconditioning or activation processes it is important that the packing gas be removed from all areas of the surface of the substrate and that all sites must be contacted if they are to be activated. While this is readily accomplished for those surface sites and areas to which easy access of a flowing preconditioning or activation gas can be obtained, such as the outer surface of the substrate plate, object or granule, it becomes much more difficult for those areas of the substrate that are deep within the pores of the substrate.

Please replace paragraph **[0017]** with a clean version of the following paragraph:

[0017] In the present process the purging gas (which may be the activation gas, the preconditioning gas or a gas which serves both purposes) is pumped into the substrate-

containing vessel, raised to [[a]] an elevated pressure and maintained at that pressure for a short predetermined time, following which the contents of the vessel are vented to the atmosphere or to an "atmospheric" pressure collection vessel. Promptly thereafter more purging gas is pumped into the substrate-containing vessel and raised to elevated pressure, maintained at elevated pressure for a short determined time, followed by venting of the vessel contents to the atmosphere or an atmospheric pressure vessel. This cycle is repeated for as many times as necessary to reach the desired level of activation of the active sites of the substrate and/or for removal of [[all]] substantially all packing gas within the substrate. If during the preconditioning a chemical reaction also occurs which generates moisture and/or another gaseous byproduct, the cycles must also continue until the chemical reaction has reached completion and all generated byproduct is also purged from the system.

Please replace paragraph **[0018]** with a clean version of the following paragraph:

[0018] We have found that the pressurize-and-vent cycle is conveniently repeated at least two, and preferably at least four, and more preferably at least ten, times. There is no absolute maximum number of cycles, but in practice 200 cycles are anticipated to be sufficient for activation or preconditioning of almost all substrates, and in many cases significantly less cycles (such as 10-100) will be quite adequate. The pressurization is preferably raised to and maintained at a level of at least two times the "atmospheric" pressure, and preferably at least five times the atmospheric pressure. Normally each cycle will return to the same elevated pressure level, but that is not required. By "atmospheric" pressure is meant the pressure of the environment into which the gas in the vessel is vented following the pressurization portion of a ~~cycle.~~ cycle, which may conveniently be the open ambient environment or a capture vessel. Preferably however, one will vent to a subatmospheric environment, in particular one with a strong vacuum, which may be as low as 10^{-7} torr (1.33×10^{-5} Pa). The important criterion is that the pressure differential between the elevated pressure during pressurization and the pressure upon venting should be at least two times, and preferably at least five times, the vented pressure. There is no absolute maximum differential, and it is contemplated that differentials as high as 10^{10} times are feasible. Typically with vacuum venting differentials of 10^8 are convenient, which with atmospheric venting the differentials are more usually on the order of 10^4. The object is to have

sufficiently high pressure during the elevated pressurization period to force the purging gas into and through essentially all parts of the substrate including the narrowest portions of the pores and into any small cul-de-sacs within the pores, and then upon venting to have a sufficiently high pressure differential so that most of the contents of the vessel will be evacuated quickly and thoroughly during the venting. The vessel contents being evacuated will contain not only a substantial amount of the purging gas but also a substantial amount of any packing or other gas which the purging gas will have displaced during the pressurization phase of the cycle.

Please replace paragraph **[0020]** with a clean version of the following paragraph:

[0020] The present invention is useful to prepare substrates for use in a wide variety of gas purification processes, including those for purifying both bulk gases and specialty gases. Among the bulk gases which can be purified in [[a]] processes for which the present invention ~~provide~~ provides initial activation and/or preconditioning are hydrogen, oxygen, nitrogen, argon, hydrogen chloride, ammonia, air, carbon dioxide and helium. Specialty gases included silane, germane, diborane, phosphine and arsine. All of these gases may also be in mixtures ~~with either other~~ having any combination of the above mentioned gases or with other gases, such as mixtures (blends) of the speciality gases with hydrogen, nitrogen or argon as the carrier gas, especially in which the dopant (non-carrier) gas concentration is from 50 ppm up to five percent of the mixture. It is preferred that the gas or gas mixture to be decontaminated will be the same as the gas or gas mixture to be used for purging to accomplish preconditioning or activation, but the present invention also contemplates that a nonidentical gas could be used in the purging if its continued presence after purging or activation will not adversely affect the purification of the contaminated gas. Thus for instance, where the gas to be decontaminated is a mixture with a small concentration of the dopant gas, it might be desired to precondition with the principal component of the mixture (i.e., the carrier gas in this case) alone as long as the substrate does not thereafter act to reduce the concentration of the dopant gas in the mixture during decontamination.

Please replace paragraph **[0023]** with a clean version of the following paragraph:

[0023] In Figure 1 the substrate is shown as being preconditioned with ammonia by prior art continuous gas flow through the vessel to produce mass transfer/molecular diffusion of the ammonia through the pores of the substrate. It will be seen that almost 1200 liters of ammonia per liter of substrate must be flowed through the vessel before the exotherm reaches its equilibrium temperature level, and another 200-400 liters must be used before the presence of the equilibrium temperature is confirmed sufficiently to warrant halting the preconditioning process. The overall time involved in the process shown in Figure 1 was 9.5 hours to initially ~~reaching~~ reach the equilibrium temperature and 2.5 hours to ~~reaching~~ reach a point at which the operator could reasonably conclude that equilibrium temperature had in fact been established.

Please replace paragraph **[0025]** with a clean version of the following paragraph:

[0025] The two graphs of Figures 1 and 2 are shown on the same grid in Figure 3. The dramatic reduction in ammonia usage (and also in preconditioning time) is evident in this Figure. It will be seen that the diffusion purging process has used more ammonia (and used more time) just for its first stage -- reaching the peak of its exotherm -- than did the present invention's forced convection purging for completion of its entire preconditioning, including the period needed to confirm that the equilibrium temperature had been reached. Thus the process of this invention can accomplish preconditioning in a small fraction of the time and with a small fraction of the gas usage ~~as are required in the~~ relative to prior art diffusion preconditioning processes.